USER'S MANUAL

DB477C

Thank you for choosing this CRYSTAL vehicle transceiver, CRYSTAL always strives to provide high quality products, And this transceiver is no exception. As you learn how to use this transceiver, you will find that your CRYSTAL unit is very user friendly. For example, each time you select a menu item, you will see a text message on the display that lets you know what you are configuring.

Though it is user friendly, this transceiver is technically complicated and some features may be new to you. Consider this manual to be a personal tutorial from the designers, allow the manual to guide you through the learning process now, then act as a reference in the coming years.

Precautions

Please observe the following precautions to prevent fire, personal injury, or transceiver damage:

⚠ Do not attempt to configure your transceiver while driving, it is dangerous.

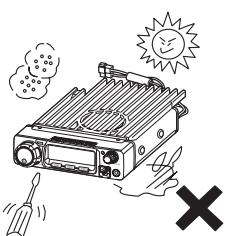
⚠ This transceiver is designed for a 13.8V DC power supply. Don't use a 24V battery to power on the transceiver.

⚠ Do not place the transceiver in excessively dusty, humid or wet areas, nor unstable surfaces.

⚠ Please keep it away from interferential devices (such as TV, generator etc.).

⚠ Do not expose the transceiver to long periods of direct sunlight nor place it close to heating appliances.

⚠ If an abnormal odor or smoke is detected coming from the transceiver, turn OFF the power immediately. Contact a Crystal service agent or your dealer.



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DB477C Mobile Radio has a stylish and sturdy housing, advanced and reliable functions and is especially designed for drivers while pusuing the company philosophy of innovation and practicality. More functions as follows:

Display on a large LCD with adjustable brightness, convenient for night-time use..

Buttons are distributed reasonably for convenient operation. Using superior quality material, better technology and high quality heatsink to ensure stable and durable operation.

Programming different CTCSS, DCS, 2Tone, 5Tone in per channel, rejecting extra calling from other radios.

Various scan functions including CTCSS/DCS Scan function.

Using 5Tone to send Message, Emergency alarm, Call all, ANI, Remotely kill, Remotely Waken, etc.

Automatic calling Identification function by DTMF--ANI or 5Tone--ANI .

Scramble function (Optional).

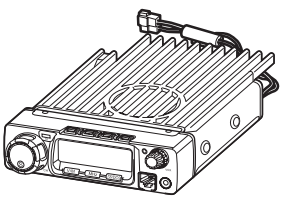
Compander function for decrease the background noise and enhance audio clarity, it can set compander ON/OFF per channel.

Theft alarm provides extra safety.

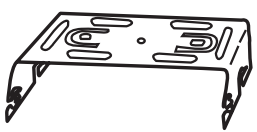
Supplied Accessories

After carefully unpacking the transceiver, identify the items listed in the table below. We suggest you keep the box and packaging.

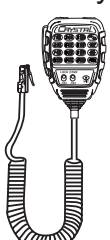
- Transceiver



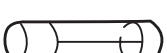
- Mobile Mounting Bracket (QMB-01)



- Microphone (QHM-03) (with DTMF keyboard)

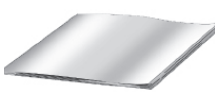


- Spare Fuses (one pair) [QF-01]



- DC Power Cable with Fuse Holder(QPL-01)

- User Manual



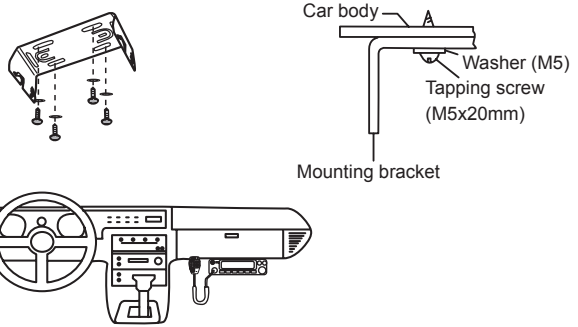
- Hardware Kit for Bracket

Black screws (M4X8mm) 4PCS(QSS-01A)	Tapping screws (M5X8mm) 4PCS(QSS-01B)	S-Washer (QSS-01D)

Mobile installation

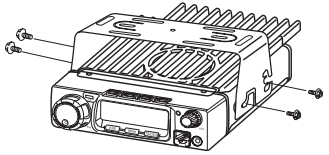
To install the transceiver, select a safe, convenient location inside your vehicle that minimizes danger to your passengers and yourself while the vehicle is in motion. Consider installing the unit at an appropriate position so that knees or legs will not strike it during sudden braking of your vehicle. Try to pick a well ventilated location that is shielded from direct sunlight.

1. Install the mounting bracket in the vehicle using the supplied self-tapping screws (4pcs) and flat washers (4pcs).

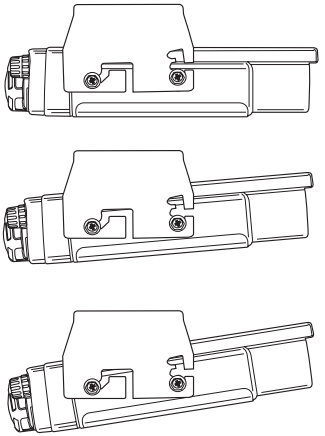


2. Position the transceiver, then insert and tighten the supplied hexagon SEMS screws.

   Double check that all screws are tightened to prevent vehicle vibration from loosening the bracket or transceiver.



Determine the appropriate angle of the transceiver, using the 3 screw hole positions on the side of the mounting bracket.



DC Power Cable Connection

NOTE Locate the power input connector as close to the transceiver as possible.

Mobile Operation

The vehicle battery must have a nominal rating of 12V. Never connect the transceiver to a 24V battery. Be sure to use a 12V vehicle battery that has sufficient current capacity. If the current to the transceiver is insufficient, the display may darken during transmission, or transmitting output power may drop excessively.

1. Route the DC power cable supplied with the transceiver directly to the vehicle's battery terminals using the shortest path from the transceiver.

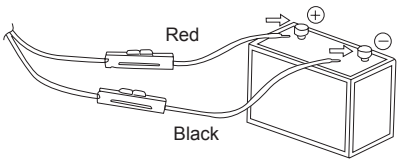
   We recommend you do not use the cigarette lighter socket as some cigarette lighter sockets introduce an unacceptable voltage drop.

   The entire length of the cable must be dressed so it is isolated from heat, moisture, and the engine secondary (high voltage) ignition system/ cables.

2. After installing cable, in order to avoid the risk of damp, please use heat-resistant tap to tie together with fuse box. Don't forget to reinforce whole cable.
3. In order to avoid the risk of short circuit, please remove negative (-) terminal of battery, then connect with radio.
4. Confirm the correct polarity of the connections, then attach the power cable to the battery terminals; red connects to the positive (+) terminal and black connects to the negative (-) terminal.

   Use the full length of the cable without cutting off excess even if the cable is longer than required. In particular, never remove the fuse holders from the cable.

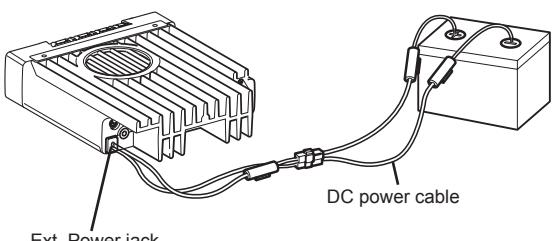
5. Reconnect any wiring removed from the negative terminal.



6. Connect the DC power cable to the transceiver's power supply connector.

   Press the connectors firmly together until the locking tab clicks.

If the ignition-key on/off feature is desired (optional feature), use the optional 12V Plug cable. Connect one of the cables between the ACC terminal or a 12v Plug that operates with the vehicle ignition or ACC switch on the vehicle and EXT POWER jack on the rear side of the unit.

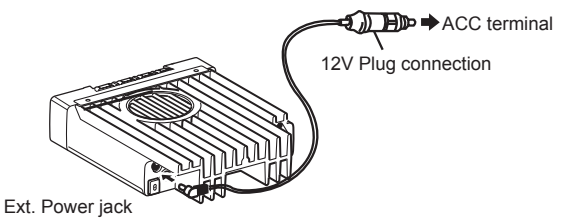


NOTE In some cars,the 12V plug is always powered. If this is the case, you cannot use it for the ignition key on/off function.

7. When the ignition key is turned to ACC or ON(Start) position with the radio turned off, the power switch illuminates. The illumination will be turned off when the ignition key is turned to the off position.

To turn on the unit, press the power switch manually while it is illuminated. (While ignition key is at ACC or ON position)

8. When the ignition key is turned to ACC or ON position with the radio's power switch on, the unit turns on automatically and the power switch will be lit. Turn the ignition key to OFF position or manually turn the power switch off to shut down the radio.
9. Using extra cable, power consumption:5MAH.
10. Without this function, user can turn on/off radio by Power knob.



Fixed Station Operation

In order to use this transceiver for fixed station operation, you will need a separate 13.8V DC power supply (not included), power supply(QRP-01) as optional accessories. Please contact local dealer to require.

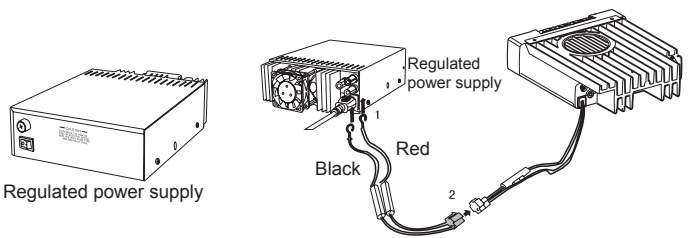
The recommended current capacity of your power supply is 12A.

1. Connect the DC power cable to the regulated DC power supply and ensure that the polarities are correct. (Red: positive, Black: negative).

   Do not directly connect the transceiver to an AC outlet.

Use the supplied DC power cable to connect the transceiver to a regulated power supply (not supplied).

Do not substitute a cable with smaller gauge wires.



DC power cable with fuse holder (QPL-01)

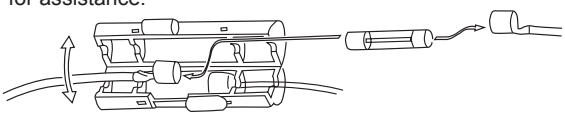
2. Connect the transceiver's DC power connector to the connector on the DC power cable.

   Press the connectors firmly together until the locking tab clicks.

NOTE	Before connecting the DC power to the transceiver, be sure to switch the transceiver and the DC power supply OFF. Do not plug the DC power supply into an AC outlet until you make all connections.

REPLACING FUSES

If the fuse blows, determine the cause, then correct the problem. After the problem is resolved, replace the fuse. If newly installed fuses continue to blow, disconnect the power cable and contact your authorized CRYSTAL dealer or an authorized CRYSTAL service center for assistance.



Fuse Location	Fuse Current Rating
Transceiver	15A
Supplied Accessory DC power cable	20A

Only use fuses of the specified type and rating, otherwise the transceiver could be damaged.

NOTE: If you use the transceiver for a long period when the vehicle battery is not fully charged, or when the engine is OFF, the battery may become discharged, and will not have sufficient reserves to start the vehicle. Avoid using the transceiver in these conditions.

Power supply voltage Display

After connecting the transceiver to the power supply, the supply voltage can be displayed on LCD by pressing the FUN key together with the SQL key.

The display immediately changes as the voltage supply changes, It also displays voltage during transmission.

The transceiver will return to its normal operation when the power is switched ON or repeat above operation.

Important: The range of displayed voltage is only from 7V to16V DC, because the displayed value is estimated, please use a voltmeter when a more precise reading is desired.

Antenna Connection

Before operating, install an efficient, well-tuned antenna. The success of your installation will depend largely on the type of antenna and its correct installation. The transceiver can give excellent results if the antenna system and its installation are given careful attention.

Use a 50Ω impedance antenna and low-loss coaxial feed-line that has a characteristic impedance of 50Ω, to match the transceiver input impedance. Coupling the antenna to the transceiver via feed-lines having an impedance other than 50Ω reduces the efficiency of the antenna system and can cause interference to nearby broadcast television receivers, radio receivers, and other electronic equipment.

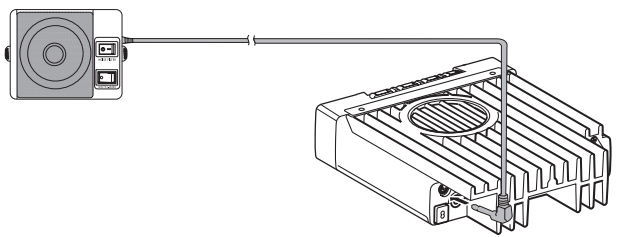
NOTE: Transmitting without first connecting an antenna or other matched load may damage the transceiver. Always connect the antenna to the transceiver before transmitting.
All fixed stations should be equipped with a lightning arrester to reduce the risk of fire, electric shock, and transceiver damage.

The possible locations of antenna on a car are shown as following:

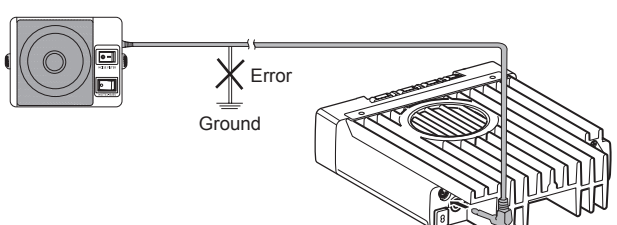
Optional Accessory Connections

External Speaker (not included)

If you plan to use an external speaker, choose a speaker with an impedance of 8Ω. The external speaker jack accepts a 3.5mm (1/8") mono (2-conductor) plug.

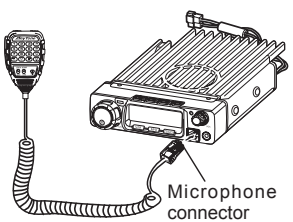


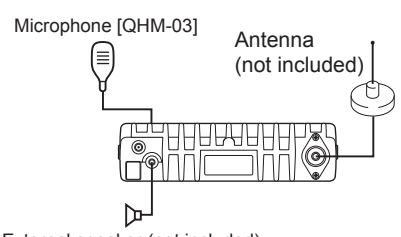
NOTE External speaker adopt double port BTL, please care about the connecting way. The speaker can not connect with the ground, otherwise the speaker will be fault. The wrong connecting way as the following picture.



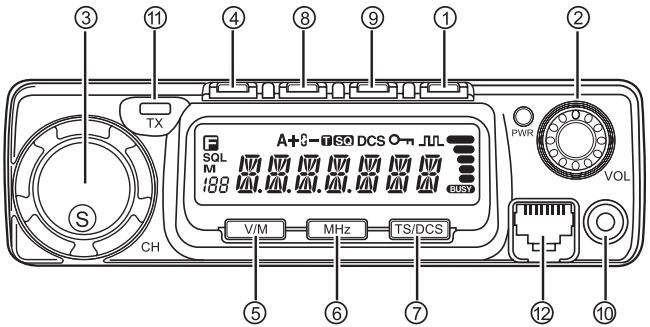
Microphone

For voice communications, connect a microphone equipped with an 8-pin modular plug into the modular socket on the front of the main unit. Press firmly on the plug until the locking tab clicks. Attach the supplied microphone hanger in an appropriate location using the screws included in the screw set.





Front panel



• Basic Functions

NO.	KEY	FUNCTION
1	Pow(Power)	Power on/Off
2	VOL	Adjust Volume Key
3	Main Dial	Change frequency, memory channel and scan direction etc.
4	FUN/SET	Function Key
5	V/M/MW	Switches between VFO mode and Channel mode
6	MHz/SHIFT	Step Size Key (step:1MHz)
7	TS/DCS/LOCK	Sets CTCSS and DCS value
8	CAL/H/L	Call key
9	SQL/D	Squelch off
10	Data Terminal	Data and Cloning port
11	TX	lights during Transmitting
12	Mic.connector	Microphone connection port

• Press FUN key until icon appears then press the following key.

NO.	KEY	FUNCTION
4	FUN/SET	Confirms the selective functions and exit
5	V/M/MW	Stores data into channels
7	TS/DCS/LOCK	Sets Keypad lock function
9	SQL/D	Compander mode on/off

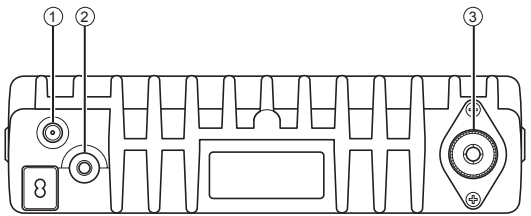
• Press FUN key and following key together to activate following function:

NO.	KEY	FUNCTION
1	Pow(Power)	Reset to factory default settings
5	V/M/MW	Erase the memory
7	TS/DCS/LOCK	Auto dialer
8	CAL/H/L	Enters clone data function mode
9	SQL/D	Enters power supply voltage indication mode

• Functions that require continuous pressing following key to be activated

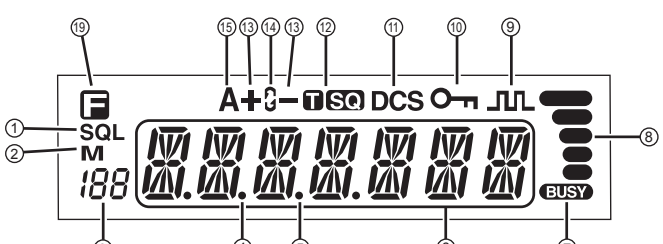
NO.	KEY	FUNCTION
4	FUN/SET	Press and hold for 2s to enter the Setting mode
9	SQL/D	Monitor mode

Rear panel



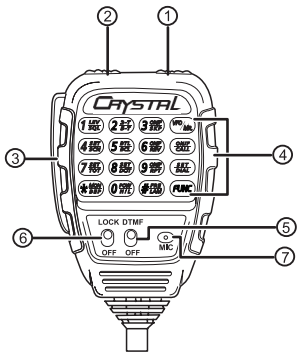
NO.	KEY	FUNCTION
1	Ext. Power Jack	Terminal for connecting optional cable QCC01 for use with ignition key On/Off function. The radio will auto power on when car is driving. The radio will auto power off when car stops.
2	Ext.Speaker Terminal	Terminal for optional external speaker SP01
3	Antenna Connector	Connection for 50Ω coaxial cable and antenna.

DISPLAY



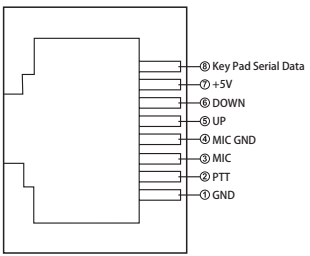
NO.	KEY	FUNCTION
1	SQL	Squelch level.
2	M	In channel mode.
3	188	Indicates the channel number in channel mode.
4	Decimal point	Channel skip.
5	Decimal point	Indicates the decimal point of frequency and the scanning function.
6		Indicates the frequency or memory name.
7	BUSY	Signal is being received or monitor.
8		Signal strength of receiving and transmitting.
9		Compander.
10		Keypad lock .
11	DCS	Set DCS function.
12	TSQ	Set CTCSS function.
13	+ −	Offset frequency direction.
14		Scramble.
15	A	Auto power off.
19	F	Pressing FUN key.

microphone



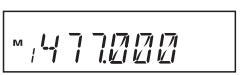
NO.	KEY	FUNCTION
1	UP	Increase frequency, channel number or setting value.
2	DOWN	Decrease frequency, channel number or setting value.
3	PTT	Press the PTT (Push-TO-Talk) key to transmit.
4	Number Key	Input VFO frequency or DTMF dial out etc..
5	DTMF ON/OFF	Switches between DTMF dialing or function operating.
6	LOCK Switch	Locks out the UP、Down、Numerical keys and Function keys.
7	MIC	Speak here during transmission.

MIC Connector Diagram(in the front view of connector)



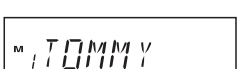
According to practical application, you can set the radio works in Professional Transceiver mode.
There are 2 levels operation menu to set functions as you need. It is easy and convenient (From No.1 to No.15 are channel function setup, From No.15 to No.29 are general setting setup).

A. Frequency + Channel mode: When set display as "FR", it enters into Frequency+Channel mode, new setting of channel operation and shortcut operation can be temporarily used by user. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.(As pic 1)



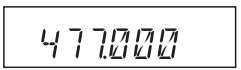
(Pic 1)

B. Channel+Name Tag Mode: When set display as "NM", it enters into Channel+Name Tag mode. At this mode, it will display corresponding channel name when the current channel is edited with name. Otherwise, it will display frequency+channel. Its operations are the same as frequency + channel mode.(As pic 2)



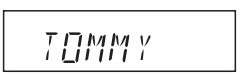
(Pic 2)

C. VFO Mode(Frequency mode): This mode shows only frequency on the display. Shortcut operation and Channel setting will be changed & stored as the latest value permanently. Once the radio is turned off or changed to new VFO frequency, the latest setting is remained until next change.(As pic 3)

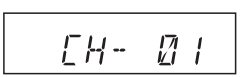


(Pic 3)

1. **Professional Transceiver Mode:**When set display mode as "CH", it enters into Professional Transceiver mode.At this mode, except scan, other shortcut operation can't operate. And from No.1-17 menu in function setting will be auto-hidden.
If there is corresponding name for current channel, the LCD will display current channel name Otherwise, it shows current channel number. (As pic 4) (As pic 5)



(Pic 4)



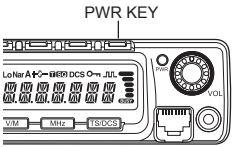
(Pic 5)

NOTE Transceiver is programmed as professional transceiver mode. You can't change through manual operation from general setting.

4. Under every mode, from No.18-29 menu in general setting can be changed and saved.

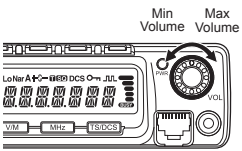
Switching The Power On/Off

According to the option selected during installation Press the [POW] switch or turn the ignition key to ACC (speed up) or ON (startup) position to power on radio. Press the [POW] key for 1s or turn the ignition key to OFF position to turn off.



Adjusting The Volume

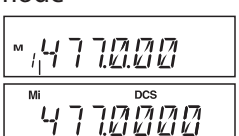
Turn the VOL knob clockwise to increase the audio level, counterclockwise to decrease.



NOTE During communication, volume can be adjusted more accurate.

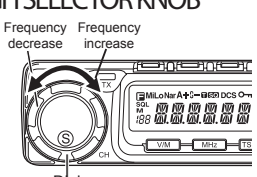
Switch between VFO and Channel mode

In standby, press [V/M] key or Microphone's [VFO/MR] key until appear **M**, this indicates current channel in channel mode. Repeat above operation to switch between Frequency mode (VFO) and Channel mode.



Adjusting Frequency/Channel THROUGH SELECTOR KNOB

1. Under frequency (VFO) mode, you can change the current frequency to the desired one through selector knob; Turn clockwise to increase frequency; turn counterclockwise to decrease. Every gear will increase or decrease one step. Press [MHz] key, the decimal point of frequency in screen will be auto-hidden. In this status, turn selector knob or Microphone [UP / DOWN] key will increase or decrease frequency quickly by 1MHz step.

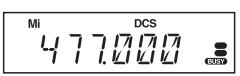


2. Under channel mode, you can change the current channel to the desired one through selector knob, clockwise turn to the forward channel, anticlockwise turn to the backward channel. In relative working mode, Microphone's [UP / DOWN] key has same function for adjusting frequency and channel.

NOTE 5k, 6.25k, 8.33K,10k, 12.5k, 20k, 25k, 30k and 50k total nine step size available for this radio.

Receiving

When the channel you are operating is called, the screen shows BUSY and field intensity, in this way, you can hear the calling from transmitting party.



NOTE If the transceiver has set at higher squelch level, it may fail to hear the calling.

When the channel you are operating is called, the screen shows BUSY and field intensity, you can't hear the calling from transmitting party, it means current channel receives a matching carrier but unmatching signaling(Refer to CTCSS/DCS encode and decode or Optional Signaling setup).

Transmitting

Press and hold [SQL] key or press MIC's [MON BEP] key to monitor for a while to confirm the channel desired is not busy. Release [SQL] or press Mic's [MON BEP] key to return standby status, then press and hold [PTT] key to speak into microphone.

Please hold the microphone approximately 2.5-5.0cm from your lips, and then speak into the microphone in your normal speaking voice to get best timbre.

NOTE Press and hold [PTT] key, LED lights RED and power intensity showed in screen indicates it is transmitting, release to receive.

Transmitting Tone-Pulse

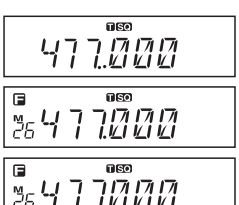
Press and hold [PTT] key, then press Microphone [DOWN] key to transmit current selected tone-pulse signal.

Transmitting OPTIONAL SIGNALING

Press and hold [PTT] key, then press Microphone UP key or press CAL key in front panel or press Mic's ONE CALL key to transmit pre-stored and selected DTMF/2Tone/5Tone optional signaling.

Channel Edit

1. Under frequency mode (VFO), turn selector knob to select the desired frequency or input frequency by MIC's numeric keys.
2. Press TS/DCS key to enter CTCSS/DCS signaling setup, turn selector knob to select the desired signaling.
3. Press FUN key, LCD appears F, M icon and current channel number, M icon flashing means current channel is empty.



4. Turn selector knob to select the desired channel number to store.
5. Press V/M key, F, M icon and channel number disappears and emit a prompt voice, thus the channel storage succeed.

Channel Delete

1. Under channel mode, turn selector knob to select channel which you want to delete.
2. Press FUN key and V/M key together, current channel will be deleted and emitted a prompt voice. M icon flashing means current channel is deleted.

squelch off/squelch off momeNTARY

SQL key programmed as Squelch Off or Squelch Off Momentary to monitor the weak signal.

1. Squelch Off: Press SQL key to disable squelch, press SQL key again to resume squelch.
2. Squelch Off Momentary: Press and hold SQL key to disable squelch, release SQL key to resume squelch.

NOTE The above functions should be set in programme software.

Squelch level Setup

Setting the radio to a tight squelch level, you can avoid unwanted signals or noise, but you may not receive a weak signal. Therefore, it will be better for you to select the normal squelch level.

1. While standby, press SQL key and turn selector knob until LCD appears **SQL** and current squelch level.

2. Turn selector knob or press MIC [UP / DOWN] key to set desired squelch level.
3. Press any key except POW and FUN key to exit.

Frequency/Channel Scan

Frequency Scan

In frequency (VFO) mode, this function is designed to monitor signal of every communicative frequency point of transceiver "step size" you have set.

1. In VFO mode, press V/M for 1s to enter into frequency scan.

2. Turn selector knob or press Microphone [UP / DOWN] key to change scan direction.
3. Press any key except POW and FUN key to exit.

Channel Scan

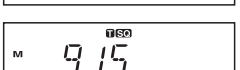
In channel mode, this function is designed to monitor signal in every channel.

1. In channel mode, Press V/M key for 1s to enter into channel scan.
2. Turn selector knob or press Microphone [UP / DOWN] key to change scan direction.
3. Press any key except POW and FUN key to exit.

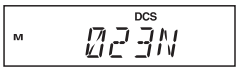
CTCSS/DCS Encode and Decode setup

Repeatedly press TS/DCS key to check whether set CTCSS/DCS encode and decode in current channel or not.

1. When LCD appears T icon, it means current channel with CTCSS encode, turn selector knob or press Microphone's [UP / DOWN] key to select desired CTCSS encode.
2. When LCD appears T and SQ icon, it means current channel with CTCSS encode and decode, turn selector knob or press Microphone's [UP / DOWN] to select desired CTCSS code.



3. When LCD appears **DCS** icon, it means current channel can be set with DCS encode and decode together, turn selector knob or press Microphone's [UP / DOWN] to select desired DCS encode and decode.

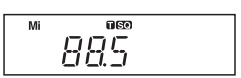


4. CTCSS:62.5-254.1, Total 51groups; DCS:000N-777I total 1024 groups. **N** is positive code, **I** is inverse code.
5. Press any key except FUN, POW and TS/DCS keys to return into standby status.

NOTE Under channel mode, this operation can be temporarily used by user. Once the radio is turned off or switched to another channel, the temporary setting will be erased.

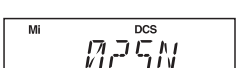
CTCSS SCAN

Repeatedly press TS/DCS key until LCD displays T and SQ icons, then hold TS/DCS key for 1S to enter into CTCSS scanning. Once finding a matching CTCSS signaling, it will stop for 15s then scan again.



DCS SCAN

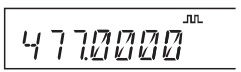
Repeatedly press TS/DCS key until LCD displays **DCS** icons, then hold TS/DCS key for 1S to enter into DCS scanning. Once finding a matching DCS signaling, it will stop for 15s then scan again.

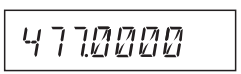


Compander (Decrease the background noise and ENHANCE AUDIO CLARITY)

Compander function will decrease the background noise and enhance audio clarity, especially in long range communication.

1. Press FUN key, then press SQL key to turn on compander function, repeat above operation again to turn off compander function.



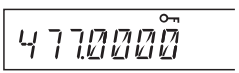


2. When LCD appears ⎍ icon, enable compander in current channel.
3. When LCD doesn't display ⎍ icon, disable compander in current channel.

KEYPAD LOCKOUT

Avoiding unintentional operation, this function will lock main keys, all keys except [SQL]、[FUN] and [POW] key are invalid.

1. Press [FUN] key until LCD displays icon, then press [TS/DCS] key until, LCD displays icon, it indicates keypad lockout function is valid.

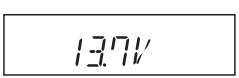


2. Repeat above operation, icon disappears, it indicates keypad lockout function is invalid.

Current Voltage ENQUIRY

This function will display Current Battery Voltage.

1. Press and hold [FUN] key, then press [SQL] key, LCD displays current battery voltage.
2. Repeat above operation to return into VFO or Channel mode.



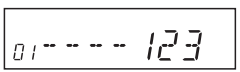
NOTE In voltage display mode, all functions and channel or frequency selection are invalid.

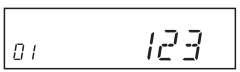
Auto-Dialer Setup

This will automatically transmit pre-programmed and stored DTMF tones. And they are often used to remote control electronic devices or AUTOPATCH phone systems available on some repeater.

1. Press and hold [FUN] key, then press [TS/DCS] key to enter the auto-dialer enquiry mode, LCD displays current default data and current group displayed on left. If no data in current group, it shows "EMPTY".
2. Turn selector knob to choose group you desired. Total:16 group, 01-16.

3. Press [SQL] key to enter into editing of current group, press MIC's numeric keys to set your desired data.
4. The display scrolls when the 7th digit is entered. The numbers 0-9, --, A-D, * and # can be stored up to a total of 23 digits.





5. After editing, press PTT or [CAL] key to send current group and store edited DTMF signaling. Press [SQL] to exit and store.

Transmitting Edited DTMF tones in the Auto-dialer memory

1. Press [FUN] key, then press [TS/DCS] key to enter into auto-dialer enquiry
2. Turn selector knob to select desired transmitting group
3. Press PTT or [CAL] key to transmit current selected DTMF tones.

General Setting

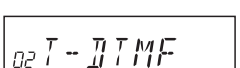
1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL or SQL to select the desired function option.
3. Turn selector knob to select the desired setup.
4. Press TS/DCS to confirm and exit.

Meanwhile, if you want to edit channel name or start up menu, press V/M or TS/DCS to move forward or backward, Press MHz to store and exit.

■ DTMF, DTMF ANI, 2Tone or 5Tone Signaling

DTMF/5Tone/2Tone signalling function as similarily as CTCSS/DCS. Without receiving correspondent tone signalling, the speaker will remain mute. DTMF and 5Tone signalling can be applied for other advanced features such as ANI, PTT ID, group call, remotely stun, remotely kill, waken,...etc.. The signalling edition must be done through programming software. Please refer to the HELP option in the programming software to know how to operate these features.

1. Press and hold FUN key for over 2s to enter into general setting menu.

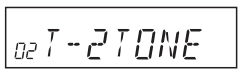


2. Press CAL / SQL to choose No.2 menu, LCD displays "**T-OFF**".
3. Turn selector knob to select the desired setup.

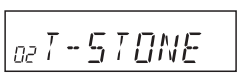
"**DTMF**": The channel will be mute by a DTMF signal. The speaker won't be open until receiving a correspondent DTMF signal. Hold "PTT" then press [UP] or press CAL directly to transmit the pre-stored DTMF signaling.

In DTMF signaling mode,press CAL for 2s until LCD displays "AN---", turn selector knob to select desired digit (the other party ID).In this mode, press TS/DCS to confirm exist digit and move cursor to next, press V/M to forward cursor.After editing, press CAL key to operate ANI call.

"**2TONE**": The channel will be mute by a 2-Tone signal. The speaker won't be open until receiving a correspondent 2-Tone signal. Hold "PTT" then press [UP] or press CAL



"**5Tone**": The channel will be mute by a 5-Tone signal. The Speaker won't be open until receiving a correspondent 5-Tone signal. Hold "PTT" then press [UP] or Press CAL

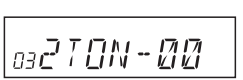


In 5Tone signaling mode, press CAL for 2s until LCD displays "AN---", turn selector knob to select desired digit(caller ID). In this mode, press TS/DCS to confirm exist digit and move cursor to next, press V/M to forward cursor.After editing, press CAL key to operate ANI call.

5. Press TS/DCS key to confirm and exit.

Sending 2-Tone Call

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.03 menu, LCD displays "**2TON XX**", "**XX**" indicates the group in the list.

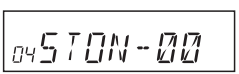


3. Turn selector knob to select the desired sending 2TONE group, Press PTT to transmit selected group.
4. Total: 32groups, 00-31, Default: 00.
5. Press TS/DCS key to confirm and exit.

NOTE Content and name of 2TONE will be edited by programming software.
This radio only query edited group or name. If there is corresponding name for 2TONE, this operation will display 2TONE corresponding name.

Sending 5-Tone Call

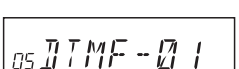
1. Press and hold FUN key for over 2s to enter general setting menu
2. Press CAL/SQL key to choose No.04 menu, LCD displays "**5TON XX**", "**XX**" indicates the group in the list.



3. Turn selector knob to select the desired sending 5TONE group, Press PTT to transmit selected group.
4. Total:100groups, 00-99, Default:00.
5. Press TS/DCS key to confirm and exit.

Sending DTMF call

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.05 menu, LCD displays "**DTMF XX**", "**XX**" indicates the group in the list.

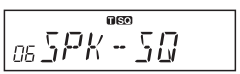


3. Turn selector knob to select the desired sending DTMF group, Press PTT to transmit selected group.
4. Total: 16groups, 00-16, Default: 00.
5. Press TS/DCS key to confirm and exit.

Signaling Combination setup

This function is used to prevent the radio from receiving irrelevent signals.

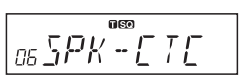
1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.06 menu, LCD displays "**SPK--SQ**".



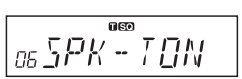
3. Turn selector knob to select the desired combination.

If select "SQ", it indicates you can hear the calling from caller when receive a matching carrier.

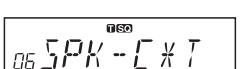
If LCD displays "**CTC**", it indicates you can hear the calling from caller when receive a matching carrier and CTCSS/DCS signaling.



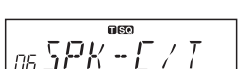
If LCD displays "**TON**", it indicates you can hear the calling from caller when receive a matching carrier and DTMF/2TONE/5TONE signaling.



If LCD displays "**C*T**", it indicates you can hear the calling from caller when receive a matching carrier and CTCSS/DCS and



If LCD displays "**C/T**", it indicates you can hear the calling from caller when receive a matching carrier and either CTCSS/DCS and DTMF/2TONE/5TONE signaling.



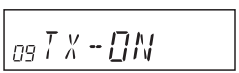
4. Press TS/DCS key to confirm and exit.

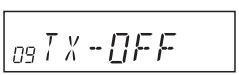
NOTE This setting will be set together with adding optional signaling and CTCSS/DCS.

TX OFF SETUP

Disable this function, it is invalid to press PTT, current channel only works in RX mode.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.09 menu, LCD displays "**TX-ON**".
3. Turn selector knob to select the desired setting. **ON:** In current channel, Press PTT to transmit. **OFF:** In current channel, Press PTT is invalid.
4. Press TS/DCS key to confirm and exit. Default:ON.

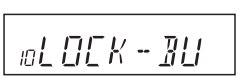


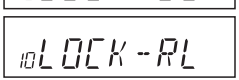


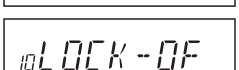
Busy Channel Lockout

BCLO is to disable transmitting while RX signal is received. Once the channel is busy and you press PTT, the radio will beep as warning and get back to receiving.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.10 menu, LCD displays "**LOCK--OFF**".
3. Turn selector knob to select the desired setting.







BU: Enable BCLO, Carrier lockout, transmitting is inhibited when current channel receives a matching carrier; press [PTT] to emit error voice prompt and back to receiving status. **RL:** Enable BTLO, transmitting is inhibited when current channel receives a matching carrier but dismatching CTCSS/DCS. Press [PTT] to emit error voice prompt and back to receiving status.

OFF: Busy channel lockout is disabled.It can transmit in any receiving status.

4. Press TS/DCS key to confirm and exit.

Editing Channel NAME

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.11 menu, LCD displays cursor and flashing.
3. Turn selector knob to select the desired letter, press TS/DCS key to
4. confirm selected letter and enter into next edition, Press V/M
5. to return forward edition.
6. After edition, press MHz key to exit.

NOTE In Frequency (VFO) mode, this function will be auto-hidden.

Reverse TX/RX

TX frequency turns to RX frequency & RX frequency changes to TX frequency. The signaling will also be reversed if CTCSS/DCS signaling exited in this channel.

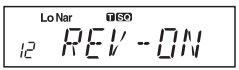
1. Press and hold FUN key for over 2s to enter general setting menu
2. Press CAL/SQL key to choose No.12 menu, LCD displays "**REV—OF**".
3. Press TS/DCS key to confirm and exit.

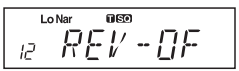
1. Turn selector knob to select the desired setting.

   ON: Enable Frequency Reverse

   OFF: Disable Frequency Reverse.

2. After edition, press TS/DCS key to exit.





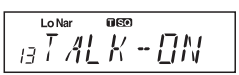
Talk Around

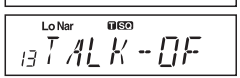
By Talk Around function, you can directly communicate with other radios the repeater range. The transceiver will transmit by RX frequency with its CTCSS/DCS signaling.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.13 menu, LCD displays "**TALK—OF**".
3. Turn selector knob to select the desired setting.

   ON: Enable Talk Around

   OFF: Disable Talk Around
4. After edition, press TS/DCS key to exit.





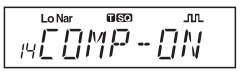
Voice Compander

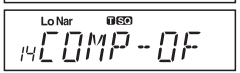
Enable this function to reduce background noise and enhance audio clarity, especially in long range communication.

1. Press and hold FUN key for over 2s to enter general setting menu
2. Press CAL / SQL key to choose No.14 menu, LCD displays "**COMP--OF**".
3. Turn selector knob to select the desired setting.

   ON: Enable compander

   OFF: Disable compander
4. Press TS/DCS key to confirm and exit.
5. Default:OFF





Scrambler setup (Encryption)

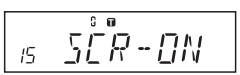
An analog voice inversion scrambler can be equipped as optionals. This special audio process can offer a more confidential communication. Other radios at same frequency will receive only disordered noises.

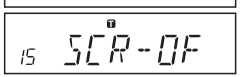
1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.15 menu, LCD displays "**SCR--OF**".
3. Turn selector knob to select the desired setting.

   ON: Enable Scrambler

   OFF: Disable Scrambler
4. Press TS/DCS key to confirm and exit.Default:OFF.

NOTE This function is optional.



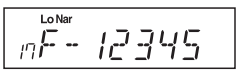


Radio's DTMF SELF ID ENQUIRY

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.16 menu, LCD displays "**D--XXX**", "**XXX**" is radio's DTMF SELF ID.
3. Press TS/DCS key to confirm and exit.

Radio's 5TONE SELF ID ENQUIRY

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.17 menu, LCD displays "F--XXXXX", "XXXXX" is radio's 5TONE SELF ID.

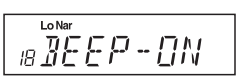


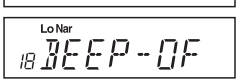
3. Press TS/DCS key to confirm and exit.

Voice Prompt

The prompting tone provides confirmation of entry, error status or malfunctions of the transceiver. You can enable or disable this function.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.18 menu, LCD displays "**BEEP--ON**".





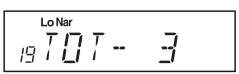
3. Turn selector knob to select the desired setting.
   ON: Enable voice prompt
   OFF: Disable voice prompt
4. Press TS/DCS key to confirm and exit. Default:ON.

NOTE Suggestion:Enable this function to check incorrect operation and malfunctions.

TOT (Time-out timer)

The time-out timer limits the amount of transmitting time. When you reach the time limit which has been programmed by your dealer, your transmission will be cut off. In order to transmit again, you must release PTT button to reset the timer.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.19 menu, LCD displays "**TOT--3**".
3. Turn selector knob to select the desired setting.



Timer: 1-30min, each level 1min

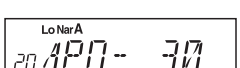
OFF: Disable TOT

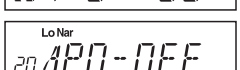
4. Press TS/DCS key to confirm and exit. Default:3.

APO (Auto power off)

Once APO is activated, the radio will be automatically switched off when the pre-set timer is running to end.

1. Press and hold FUN key for over 2s to enter general
2. setting menu.
3. Press CAL / SQL key to choose No.20 menu, LCD displays "**APO--OFF**".
4. Turn selector knob to select the setting.





30MIN: Auto power off after 30m

1HOUR: Auto power off after 1h

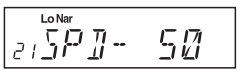
2HOUR: Auto power off after 2h

OFF: Disable Auto power off

5. Press TS/DCS key to confirm and exit.Default:OFF

DTMF Transmitting Time

1. Press and hold FUN key for over 2s to enter general setting.

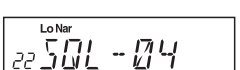


2. Press CAL / SQL key to choose No.21 menu, LCD displays "**SPD--50**".
3. Turn selector knob to select the desired setting. 30/50/100/200/300/500, which indicates the time for sending each DTMF signal & the interval between each DTMF being sent.
4. Press TS/DCS key to confirm and exit. Default:50MS.

Squelch level Setup

Setting the radio to a tight squelch level, you can avoid unwanted signals or noise, but you may not receive a weak signal. Therefore, it will be better for you to select the normal squelch level

1. Press and hold FUN key for over 2s to enter general setting menu.



2. Press CAL / SQL key to choose No.22 menu, LCD displays "**SQL--04**".
3. Turn selector knob to select the desired squelch level. OF-20 total 21, OF is min setting value(ON)
4. Press TS/DCS key to confirm and exit. Default:04

Press SQL, then turn selector knob also can select the desired squelch level.

NOTE If the transceiver has set at higher squelch level, it may fail to hear the calling.If set at lower squelch level, the radio will be interfered.

Scan Dwell Time Setup

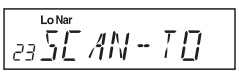
There are 3 kinds of Scan Dwell Time for option.

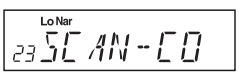
1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.23 menu, LCD displays "**SCAN--TO**".
3. Turn selector knob to select the desired Scan Dwell Time.

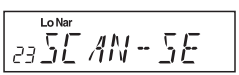
   TO: It pauses 15s once scanning a matching signal, then resume scan.

   CO: It pauses once scanning a matching signal, signal disappeared then resume scan.

   SE: It stops once scanning a matching signal.
4. Press TS/DCS key to confirm the selection and exit. Default:TO.

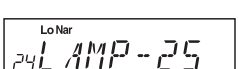






LCD Backlight

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.24 menu, LCD displays "**LAMP--25**".
3. Turn selector knob to select the desired LCD backlight brightness 1-32 total 32 level backlight brightness.
4. Press TS/DCS key to confirm and exit. Default:25.



Pilot Frequency

This function uses to start repeater. It needs a certain intensity Pilot Frequency to start dormant repeater. As usual, no need to send pilot frequency again once repeater started.

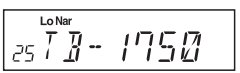
1. Press and hold FUN key for over 2s to enter general setting.
2. Press CAL/SQL key to choose No.25 menu, LCD displays "**TB--1750**".
3. Turn selector knob to select the desired pilot frequency.

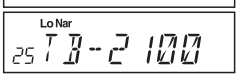
   1750HZ: Pilot frequency1750HZ

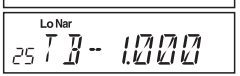
   2100HZ: Pilot frequency 2100HZ

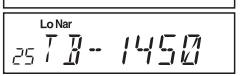
   1000HZ: Pilot frequency 1000HZ

   1450HZ: Pilot frequency 1450HZ
4. Press TS/DCS key to confirm the selection and exit. Default:1750HZ





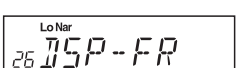


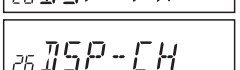


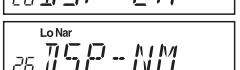
Display Mode Setup

There are 3 different dispaly modes: Frequency+Channel mode, & Channel mode&Channel+Name Tag mode.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL/SQL key to choose No.26 menu, LCD displays "**DSP—FR**".







3. Turn selector knob to select the desired mode.

FR: Frequency+Channel mode(Amateur transceiver mode).

CH: Channel mode(Professional transceiver mode).

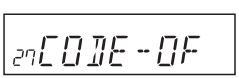
NM: Channel+Name Tag mode(Amateur transceiver mode), ifchannel not named, it displays Frequency+Channel mode.

4. Press TS/DCS key to confirm and exit. Default:FR.

PIN Setup

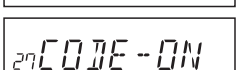
Enable this function, you have to insert a matching PIN to enter into normal status when radio is turned on.(Pin setup by programme software).

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.27 menu, LCD displays "**CODE-OF**".



3. Turn selector knob to enable/disable Pin setup.

ON: Turn on Pin setup



OFF: Turn off Pin setup

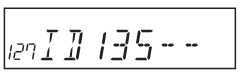
4. Press TS/DCS key to confirm and exit.Default:OFF

Address list

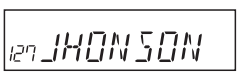
You store desired ID and corresponding ID name in address list. The LCD displays ID corresponding name if radio received ANI calling and find matching ID in address list.

1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.28 menu, LCD displays "**BOOK**".

3. Press MHz to enter into ID setting, press CAL / SQL to select the desired group (00-127, total is 128 group ID). Turn selector knob to select desired number, press TS/DCS confirm and move cursor to next edition, press V/M to clear out all digits.



4. After finishing edition, press to confirmand enter into edition of current group's ID corresponding name.Turn selector knob to select desired letter, press TS/DCS to move cursor to next edition, Press V/M to clear out all letters. 00-127, total 128 group ID and corresponding ID name.

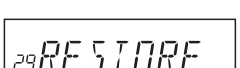


5. Press MHz to confirm and return into main menu. Repeat above Step 3 and Step 4 operations to edit multi-ID and corresponding ID name.
6. Press TS/DCS key to return into standby status.

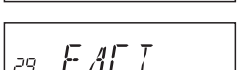
Factory Default

If your radio seems to be malfunctioning, resetting the microprocessor may solve the problem. When performing the reset, you may lose memory data and stored information. Back up or write down important data before performing the reset.

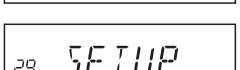
1. Press and hold FUN key for over 2s to enter general setting menu.
2. Press CAL / SQL key to choose No.29 menu, LCD displays "RESTORE".



3. Turn selector knob to select the desired operation.

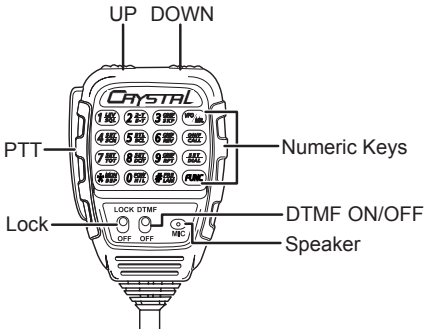


FACT:Resume factory default for channel, signaling and general setting .



SETUP:Return initial setup for No.18-No.27 general settings menu

Press MHz to confirm general setting



You can operate the transceiver by keypad or input desired frequency or channel through the QHM-03 microphone (Note:In professional transceiver mode, other keys are invalid except PTT, [UP / DOWN], (ONE CALL) and (SET DIAL)).

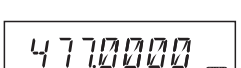
Keypad Lock

Pull down the slide switch to lock position, the lamp is turned off and all of keypads is not work except PTT switch.

Transmitting DTMF By Microphone KeyPAD

Slide DTMF key to DTMF position, press and hold the [PTT] key, transmitting the desired DTMF signaling by the numeric key directly. (Note:Slide DTMF key to DTMF position, the keyboard is invalid in standby).

Function Setup By Microphone Keypad



Switches between VFO and channel mode

In standby, press (VFO/MR) key to switch between channel mode and Frequency mode (VFO).

Short Calling

In standby, press (ONE CALL) to transmit the selected DTMF/2TONE/5TONE in current channel.

Transmitting DTMF Code:In standby, press (SET DIAL), LCD displays DTMF data and group. Press [UP / DOWN] key to select the desired transmitting DTMF group, then Press PTT to transmit.

If no DTMF data in current group, LCD displays "EMPTY", press (SET DIAL) key again and input desired DTMF code by keypad, press PTT to transmit and store DTMF data.

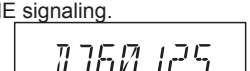
Squelch Level

1. In standby, press (FUNC), then press (1 LEV SQL), LCD displays "**SQL**" and current squelch level.
2. Press UP / DOWN to adjust the desired squelch level. (press (FUNC), then press (1 LEV SQL), turn selector knob also can adjust the desired squelch level.
3. Press number key to confirm and exit.

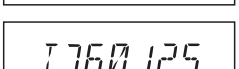
Optional signaling

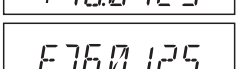
In standby, press (FUNC), then press (2 ABC) to add optional signaling, repeat above operation to set DTMF, 2TONE or 5TONE signaling.

When first bit of Exa byte in frequency displays "**D**", it indicates DTMF function enable.



When first bit of Exa byte in frequency displays "**T**", it indicates 2Tone function enable.





When first bit of Exa byte in frequency displays "**F**", it indicates 5Tone function enable.

NOTE This function can be temporarily used in channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

Scan Skip

In Channel mode, press [FUNC] then press [3 DWF SKIP], decimal point displayed between frequency's ten digit and unit digit, it means current channel is scan skip. Repeat above operation to set scan or scan skip in current channel.

1. decimal point displayed between frequency's ten digit and unit digit, it means current channel is scanned skip.
2. decimal point is not displayed between frequency's ten digit and unit digit, it means current channel is scanned.

Frequency/Channel scan

In corresponding mode, press [FUNC] then press [4 SET SCN] key to enter into scanning.

In scanning mode, press UP / DOWN to change scan direction.

Busy Channel Lockout

BCLO is to disable transmitting while RX signal is received. Once the channel is busy and you press PTT, the radio will beep as warning and get back to receiving.

1. In standby, press [FUNC], then press [5 BTL BCT] to enter into Busy Channel Lockout.
2. Press [UP / DOWN] to select the desired value.

BU: Enable BCLO, Carrier lockout, transmitting is inhibited when current channel receives a matching carrier; press [PTT] to emit error voice prompt.

RL: Enable BTLO, transmitting is inhibited when current channel receives a matching carrier but dis-matching CTCSS/DCS. Press [PTT] to emit error voice prompt It can transmit in any receiving status.

OFF: Busy channel lockout is disabled.

3. Press number keys to confirm and exit.

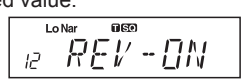
NOTE This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

Reverse TX/RX

TX frequency turns to RX frequency & RX frequency changes to TX frequency. The signaling will also be reversed if CTCSS/DCS signaling exited in this channel.

1. In standby, press [FUNC], then press [6 DWF REV], LCD displays "**REV—ON**"
2. Press [UP / DOWN] to select the desired value.

ON: Enable Frequency Reverse
OFF: Disable Frequency Reverse



3. Press number keys to confirm and exit.

NOTE This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

TOT (Time-out timer)

The time-out timer limits the amount of transmitting time. When you reach the time limit which has been programmed by your dealer, your transmission will be cut off. In order to transmit again, you must release PTT button to reset the timer.

1. In standby, press [FUNC], then press [7] LCD displays "**TOT-X**".
2. Press [UP / DOWN] to select the desired value.
3. Press number key to confirm and exit.

CTCSS/DCS Encode and Decode

1. In standby, press [FUNC], then press [8] to enter into CTCSS/DCS Encode and Decode.
2. Repeat above operation to set as below:

   LCD displays T icon, it indicates CTCSS encode set in current channel.

   LCD displays T and SQ icon, it indicates CTCSS encode and decode set in current channel.

   LCD displays **DCS** icon, it indicates DCS encode and decode set in current channel.
3. In corresponding icon, press [UP / DOWN] to select the desired CTCSS/DCS encode and decode.
4. Press [*], [SET DIAL], [ON/F CALL] or [VFO/MR] to confirm and exit.

NOTE This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings.

Talk Around

By Talk Around function, you can directly communicate with other radios in your group in case the repeater is not activated or when you are out of the repeater range. The transceiver will transmit by RX frequency with its CTCSS/DCS signaling.

1. In standby, press [FUNC], then press [9] key, LCD displays "**TALK--OF**".
2. Press [UP / DOWN] to select the desired setting.

   ON: Enable Talk Around

   OFF: Disable Talk Around
3. Press number key to confirm and exit.

NOTE This function can be temporarily used in Channel mode. Once the radio is turned off or switched to another channel, the temporary setting will be erased and back to initial settings

Voice Prompt

The prompting tone provides confirmation of entry, error status or malfunctions of the transceiver. You can enable or disable this function.

1. In standby, press [FUNC], then press [*], LCD displays "**BEEP--XX**".
2. Press [UP / DOWN] to turn on/off BEEP voice prompt.

   BEEP—OF: turn off voice prompt

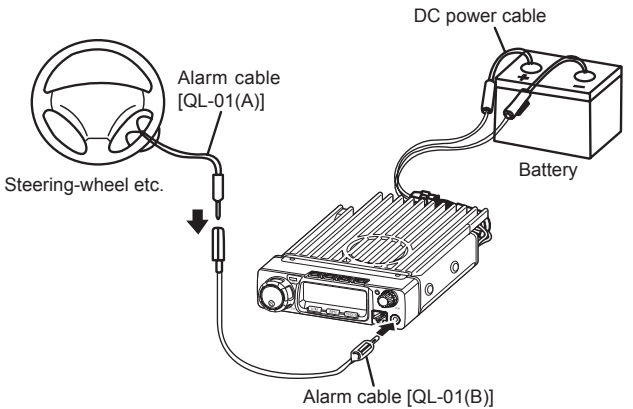
   BEEP—ON: turn on voice prompt
3. Press number key to exit and store.

LCD Backlight

1. In standby status, press [FUNC], then press [#] LCD displays "**LAMP-XX**".
2. Press [UP / DOWN] to select desired backlight brightness(1-32 levels).
3. Press number keys to confirm and exit.

Long-distance Anti-theft Alarm

This function is mainly use for simple anti-theft alarm device in vehicles. When the transceiver be removed in an improper manner, the transceiver will emit and transmit alarming and background voice to system and other transceiver of the same frequency.



Connect DC power cable with car battery.

1. Connect the optional alarm cable QL-01(A) to the data jack on the front panel as shown. Secure the other end of the cable to an object that stays fixed in vehicle. (Note: if alarm cable QL-01 (A) is not enough long, you can choose optional alarm cable QL-01 (B) to extend).
2. When transceiver power off by press [POW] key, the long-distance anti-theft alarm enable.

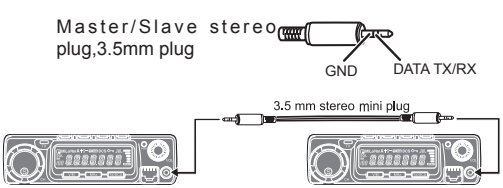
NOTE The long-distance anti-theft alarm only available when transceiver power off.

3. When the alarm cable QL-01(A) or QL-01(B) is removed from the DATA jack or cut by improper sequence, the alarm function enable and will alarm as programmed. In alarming, the transceiver will stop alarm once receiving a matching signal. And alarm again when a matching signal disappeared.
4. Restart radio to cancel anti-theft alarming.Reconnect with alarm cable and turn off radio, the system will return to alarm mode.

■ Cable Clone

This feature will copy the programmed data and parameters in the master unit to slave units. It copies the parameters and memory program settings.

1. Use optional CP50 cloning cable, connect the cable between the data jacks on both master and slave.
2. Press and hold [FUN] key, then press [CAL] key to enter into cloning mode, LCD displays "**CLONE**".



3. Press master unit's [PTT] key, LCD displays "**SD XXX**", "**XXX**" indicates data volume in transmitting. Slave unit displays "**LD XXX**", "**XXX**" indicates received data volume. When the transmission is successfully finished, the master and slave unit both display "**PASS**". Turn off the power, disconnect the cable and repeat step 2 to step 3 operations to clone the next slave unit.

NOTE If the data is not successfully transmitted, turn off both units, make sure the cable connection is correct and repeat the entire operation from the beginning.

Default Setting after Resetting

	DB477C		DCS encode and decode	-
VFO frequency	477.00MHz		DCS code	023N
Memory channel 0-199	-		Key-lock setting	OFF
Offset direction	-		TOT	OFF
Channel Step	12.5		APO	OFF
CTCSS encode and decode	-		Squelch Level	4
CTCSS tone frequency	88.5Hz			

Trouble Shooting

Problem	Possible Causes and Potential Solutions
(a) Power is on, nothing appears on Display.	+ and - polarities of power connection are reversed. Connect red lead to plus terminal and black lead to minus terminal of DC power supply.
(b) Fuse is blown.	Check and solve problem resulting in blown fuse and replace fuse with new fuse.
(c) Display is too dim.	Dimmer setting is "LAMP-L". Please make the dimmer setting "LAMP-H".
(d) No sound comes from speaker.	• Squelch is muted. Decrease squelch level. • Tone or CTCSS/DCS squelch is active. Turn CTCSS or DCS squelch off.
(e) Key and Dial do not function.	Key-lock function is activated. Cancel Key-lock function.
(i) Rotating Dial will not change memory channel.	Transceiver is in CALL mode. Press the VFO or memory mode.
(g) PTT key is pressed but transmission does not occur.	• Microphone connection is poor. Connect microphone properly. • Antenna connection is poor. Connect antenna properly.

General	
Frequency Range	UHF CB: 476.4250~477.4125MHz
Channel Spacing	12.5K
Phase-locked Step	5KHz, 6.25KHz, 8.33KHz, 10KHz, 12.5KHz, 15KHz, 20KHz, 25KHz, 30KHz, 50KHz
Operating Voltage	13.8V DC ±15%
Squelch	Carrier/CTCSS/DCS/5Tone/2Tone/DTMF
Frequency Stability	±2.5ppm
Operating Temperature	-20℃~+60℃
Dimensions(WxHxD)	145 (W) x 47 (H) x 190 (L)mm
Weight	about 1.2Kg

Receiver (ETSI EN 300 086 standard testing)	
Sensitivity (12dB Sinad)	≤0.35μV
Adjacent Channel Power	≥60dB
Intermodulation	≥60dB
Spurious Emission	≥70dB
Audio Response	+1~-3dB (0.3~2.55KHz)
Hum & Noise	≥40dB
Audio distortion	≤5%

Transmitter (ETSI EN 300 086 standard testing)	
Power Output	5W
Modulation	11KΦF3E
Adjacent Channel Power	≥60dB
Hum & Noise	≥36dB
Spurious Emission	≥60dB
Audio Response	+1~-3dB (0.3~2.55KHz)
Audio Distortion	≤5%

NOTE Specifications are subject to change without notice due to advancements in technology.

50 groups CTCSS Tone Frequency(Hz)

67.0	79.7	94.8	110.9	131.8	156.7	171.3	186.2	203.5	229.1
69.3	82.5	97.4	114.8	136.5	159.8	173.8	189.9	206.5	233.6
71.9	85.4	100.0	118.8	141.3	162.2	177.3	192.8	210.7	241.8
74.4	88.5	103.5	123.0	146.2	165.5	179.9	196.6	218.1	250.3
77.0	91.5	107.2	127.3	151.4	167.9	183.5	199.5	225.7	254.1

1024 groups DCS Code.

000	001	002	003	004	005	006	007
010	011	012	013	014	015	016	017
020	021	022	023	024	025	026	027
030	031	032	033	034	035	036	037
040	041	042	043	044	045	046	047
050	051	052	053	054	055	056	057
060	061	062	063	064	065	066	067
070	071	072	073	074	075	076	077
100	101	102	103	104	105	106	107
110	111	112	113	114	115	116	117
120	121	122	123	124	125	126	127
130	131	132	133	134	135	136	137
140	141	142	143	144	145	146	147
150	151	152	153	154	155	156	157
160	161	162	163	164	165	166	167
170	171	172	173	174	175	176	177
200	201	202	203	204	205	206	207
210	211	212	213	214	215	216	217
220	221	222	223	224	225	226	227
230	231	232	233	234	235	236	237
240	241	242	243	244	245	246	247
250	251	252	253	254	255	256	257
260	261	262	263	264	265	266	267
270	271	272	273	274	275	276	277
300	301	302	303	304	305	306	307
310	311	312	313	314	315	316	317

320	321	322	323	324	325	326	327
330	331	332	333	334	335	336	337
340	341	342	343	344	345	346	347
350	351	352	353	354	355	356	357
360	361	362	363	364	365	366	367
370	371	372	373	374	375	376	377
400	401	402	403	404	405	406	407
410	411	412	413	414	415	416	417
420	421	422	423	424	425	426	427
430	431	432	433	434	435	436	437
440	441	442	443	444	445	446	447
450	451	452	453	454	455	456	457
460	461	462	463	464	465	466	467
470	471	472	473	474	475	476	477
500	501	502	503	504	505	506	507
510	511	512	513	514	515	516	517
520	521	522	523	524	525	526	527
530	531	532	533	534	535	536	537
540	541	542	543	544	545	546	547
550	551	552	553	554	555	556	557
560	561	562	563	564	565	566	567
570	571	572	573	574	575	576	577
600	601	602	603	604	605	606	607
610	611	612	613	614	615	616	617
620	621	622	623	624	625	626	627
630	631	632	633	634	635	636	637
640	641	642	643	644	645	646	647
650	651	652	653	654	655	656	657
660	661	662	663	664	665	666	667
670	671	672	673	674	675	676	677

700	701	702	703	704	705	706	707
710	711	712	713	714	715	716	717
720	721	722	723	724	725	726	727
730	731	732	733	734	735	736	737
740	741	742	743	744	745	746	747
750	751	752	753	754	755	756	757
760	761	762	763	764	765	766	767
770	771	772	773	774	775	776	777

NOTE **N** is positive code, **I** is negative code, total: 232groups.

Transmit and Receive Procedure

Your two-way radio contains a transmitter and a receiver. To control your exposure and ensure compliance with the general population/ uncontrolled environment exposure limits, always adhere to the following procedure: • Transmit no more than 50% of the time.

• To receive calls, release the PTT button.

• To transmit (talk), press the Push to Talk (PTT) button.

Transmitting 50% of the time, or less, is important because the radio generates measurable RF energy exposure only when transmitting (in terms of measuring standards compliance).

Radio Operation and EME Exposure

Unauthorised antennas, modifications, or attachments could damage the radio and violate compliance. Do NOT hold the antenna when the radio is “IN USE.” Holding the antenna reduces the effective range. Do not use the radio if the antenna is damaged. If a damaged antenna makes contact with your skin, a minor burn can result.

Electromagnetic Iterference/Compatability

Nearly every electronic device is susceptible to electromagnetic interference (EMI). To avoid the possibility of electromagnetic interference and/or compatibility conflicts, turn off your radio in any location where posted notices instruct you to do so such as health care facilities.

Aircraft

When instructed to do so, turn off your radio when onboard an aircraft. Any use of a radio must be in accordance with applicable regulations per airline crew instructions.

Medical Devices

Pacemakers

The Advanced Medical Technology Association recommends that a minimum separation of 6 inches (15cm) be maintained between a radio and a pacemaker. These recommendations are consistent with the independent research by and recommendations of the U.S. Food and Drug Administration.

People with pacemakers should:

• ALWAYS keep the radio more than 15cm from their pacemaker when the radio is turned ON.

• Not carry the radio in the breast pocket (Handheld Radio).

• Use the ear opposite the pacemaker to minimise the potential for interference.

• Turn the radio OFF immediately if there is any reason to suspect that interference is taking place.

Hearing Aids

Some radios may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

Other Medical Devices

If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from RF energy. Your physician may be able to assist you in obtaining this information.

General Warnings

Keep the radio out of reach of babies and young children.

Transmitting Range

The talk range will depend on your surroundings and environment it will be affected by obstructions such as hills or buildings.

Talk range depends on the terrain. It will be affected by concrete structures, heavy foliage and by operating radios indoors or in vehicles.

Your DB477C is simplex “one way at a time”. While you are speaking, you can not receive a transmission.

Your DB477C is on an open-license band. Always identify yourself when transmitting on the same channel.

IMPORTANT: Before transmitting on a UHF channel listen to ensure it is not already in use.

Transmitting (sending speech)

The unit is continuously in the Receive mode when the unit is turned ON and not transmitting. When a signal is received on the current channel, “RX” icon will be displayed on the LCD screen. a. Press and hold the PTT (Push to Talk) button to transmit your voice. The transmit signal icon “TX” will display on the LCD screen. b. Hold the unit in a vertical position with the Mic (Microphone) 5 cm away from the mouth. While holding the PTT button, speak into the microphone in a normal tone of voice. c. Release the PTT button when you have finished transmitting.

For others to receive your transmission, they must be on the same channel as you.

Call Ring Tone

37

You can use the CALL button to send a tone to other users on the same channel. To activate this feature; a. With the unit in normal mode, press and release the CALL button. The unit will transmit a 2-second page tone to the other unit/s set with the same channel within transmitting range. NOTE: This function is only possible every 60 seconds.

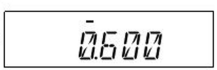
Roger Beep

This is a tone which is automatically transmitted whenever the PTT button is released. This alerts the receiving party that you have ended the transmission, and you are now in receive mode.

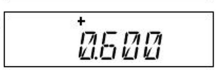
OFFSET DIRECTION AND OFFSET FREQUENCY SETUP

Repeater receives a signal(UP-LINK) on one frequency and re-transmits on another frequency(DOWN-LINK). The difference between these two frequencies is called the offset frequency. If the UP-LINK frequency higher than DOWN-LINK frequency, the direction is positive, If it is lower, the shift direction is negative.

1. Press [FUN] key until the F icon displays on the LCD, then press [MHz] key, LCD displays offset direction and offset frequency.



2. Repeatedly press [MHz] key to select positive offset and negative offset.



3. When LCD displays "+" icon, it indicates positive offset, which means transmitting frequency higher than receiving frequency.
4. When LCD displays "-" icon, it indicates negative offset, which means transmitting frequency lower than receiving frequency.
5. Turn selector knob or Mic's [UP / DOWN] key to change offset frequency, offset frequency changed as per stepping.
6. Press any key except [FUN] and [MHz] key to exit into standby.

NOTE Under channel mode,this operation can be temporarily used by user.
Once the radio is turned off or switched to another channel,the temporary setting will be erased.

Channel 5 and 35 (paired for Duplex repeaters) are reserved as emergency channels and should be used only in an emergency. CTCSS and DCS will not operate on channels 5 and 35.

A list of currently authorised channels can be obtained from the ACMA website in Australia and the MED website in New Zealand. Channel 11 is a calling channel generally used to call others and channel 40 is the customary road vehicle channel. Once contact is established on the calling channel, both stations should move to another unused “SIMPLEX” channel to allow others to use the calling channel. Channels 22 and 23 are for Telemetry and Telecommand use, voice communications are not allowed on these channels by law. Channel 9 and above are the best choices for general use in Simplex mode.

Radiocommunications (Citizen Band Radio Stations) Class Licence 2002

No licence is required to own or operate this radio in Australia and New Zealand. The Radiocommunications (Citizen Band Radio Stations) Class Licence 2002 contains the technical parameters, operating requirements, conditions of licence and relevant standards for Citizen Band (CB) radios. CB radios must comply with the class licence for their use to be authorised under the class licence.

UHF channels and frequencies

IMPORTANT NOTE: The operation of your UHF radio in Australia and New Zealand is subject to conditions in the following licenses: In Australia the ACMA Radio communications (Citizen Band Radio Stations) and in New Zealand by MED the General User Radio License for Citizen Band Radio.

You may encounter operational issues changing over from 25kHz to 12.5 kHz channel spacing. Operating volumes can vary when receiving wideband (5kHz deviation) transmissions on newer narrow band equipment or narrow band (2.5kHz deviation) transmissions being sent to older wideband equipment. Older and newer adjacent channels can cause interference.

Notes

Technical Assistance

If you need assistance setting up or using your CRYSTAL product now or in the future, call

CRYSTAL Support. Australia

TEL: 03 – 8587 8898

FAX: 03 – 8587 8866 Mon-Fri 9am – 5pm AEST

Please retain this user guide for future reference.

CRYSTAL MOBILE WARRANTY AGAINST DEFECTS

This warranty against manufacturing defects is given by TDJ Australia Pty Ltd ACN 006 385 191). Our contact details are set out in clause 2.7.

1. Consumer guarantee

1.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major *(description according to Australian Consumer Laws)* failure and compensation for any other reasonably foreseeable *(description according to Australian Consumer Laws)* loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to meet manufacturers specifications and the failure does not amount to a major failure.

1.2 To the extent we are able, we exclude all other conditions, warranties and obligations which would otherwise be implied.

2. Warranty against defects

2.1 This Warranty is in addition to and does not limit, exclude or restrict your rights under the Competition and Consumer Act 2010 (Australia) or any other mandatory protection laws that may apply. Consumer guarantees are a set of rules that apply to goods and services purchased by consumers under the Australian Consumer Law (ACL).

These rules set out the circumstances under which a business is required to provide a consumer with a remedy.

The consumer guarantees automatically apply regardless of any voluntary or extended warranty given by a seller or manufacturer of goods and services, or if such a warranty has expired.

2.2 We warrant our goods to be free from defects in materials and workmanship for the warranty period from the date of original sale (or another period we agree to in writing). Subject to our obligations under clause 1.2, we will at our option, either repair or replace goods which we are satisfied do not meet manufacturers specifications. We warrant any replacement parts for the remainder of the period of warranty for the goods into which they are incorporated.

2.3 To the extent permitted by law, our sole liability for breach of a condition, warranty or other obligation implied by law is limited (a) in the case of goods we supply, to any one of the following as we decide - (i) the replacement of the goods or the supply of equivalent goods; (ii) the repair of the goods; (iii) the cost of repairing the goods or of acquiring equivalent goods; (b) in the case of services we supply, to any one of the following as we decide – (i) the supplying of the services again; (ii) the cost of having the services supplied again.

2.4 For repairs outside the warranty period, we warrant our repairs to be free from defects in materials and workmanship for three months from the date of the original repair. We agree to re-

repair or replace (at our option) any materials or workmanship which we are satisfied do not meet manufacturers specifications.

2.5 We warrant that we will perform services with reasonable care and skill and agree to investigate any complaint regarding our services made in good faith. If we are satisfied that the complaint is justified, and as our sole liability to you under this warranty (to the extent permitted at law), we agree to supply those services again at no extra charge to you.

2.6 To make a warranty claim you must before the end of the applicable warranty period, at your own cost, return the goods you allege do not meet manufacturers specifications, provide written details of the alleged defect, and give us an original or copy of the purchase receipt, sales invoice or some other evidence showing details of the transaction.

2.7 Send your claim to: TDJ Australia PTY LTD. 78 Mills Road, Braeside Melbourne
Victoria 3195, Australia,
TEL: 03 8587 8898 FAX: 03 8587 8866
Email: tdj-service-team@tdj.com.au

2.8 If we determine that your goods do not meet manufacturers specifications, we will pay for the cost of returning the repaired or replaced goods to you. If we find your goods meet manufacturers specifications and no major defect is found, we will contact you to arrange the return of the goods at your expense.

3. What this warranty does not cover

3.1 This warranty will not apply in relation to: (a) goods modified or altered in any way; (b) defects and damage caused by use with non Standard Communications products; (c) repairs performed other than by our authorized *service team*; (d) defects or damage resulting from misuse, accident, impact or neglect; (e) goods improperly installed or used in a manner contrary to the relevant instruction manual; or (f) goods where the serial number has been removed or made illegal.

4. Warranty period

4.1 We provide the following warranty on Crystal Mobile products. No repair or replacement during the warranty period will renew or extend the warranty period past the period from original date of purchase.

This products warranty period is 5 years from date of purchase